

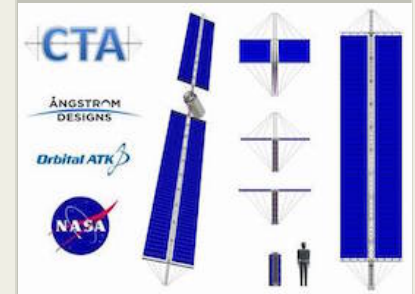
Compact Telescoping Array Design and Development, Phase II

Completed Technology Project (2016 - 2018)



Project Introduction

Solar arrays power the vast majority of space missions. Solar arrays with higher power, better mass efficiency and improved packaging are critical, especially given NASA interest in solar electric propulsion (SEP). The Phase I results shows that the Compact Telescoping Array (CTA) architecture, originally conceived by a NASA sponsored team, is a very promising new technology. Not only has CTA shown outstanding performance metrics, but it does so in a manner that is scalable, reliable and offers compact stowage. The proposed innovation is a solar array design consisting of a single central truss structure flanked by tensioned flexible photovoltaic blankets. This configuration has been shown in multiple analytical studies to be the most mass efficient for a cantilevered solar array. Phase I results confirm that CTA has very low structural mass which, with state-of-practice cell technology, allows the platform to deliver excellent specific power. For example, sub-200 kW systems show specific power approaching 190 W/kg and mega-Watt versions of CTA still produce better than 150 W/kg. The CTA stowed wing achieves the "compact" attribute due to the fact that the two primary components of the system, the boom and the PV blankets, though by different methods, both stow into highly volume-efficient packages. The individual boom segments all nest neatly inside one another while the PV blankets stow into compact Z-folded stacks. The result is a system that is capable of delivering compactness in excess of 100 kW/m², far beyond expectations. The CTA system, although a new solar array configuration, is shown through Phase I research to have high reliability. This is achieved by leveraging heritage mechanical subsystems and by minimizing new mechanism design, thereby effectively delivering a higher TRL than would ordinarily be associated with a new system. The CTA design draws heavily from heritage designs of Angstrom Designs subcontractor Orbital ATK Goleta.



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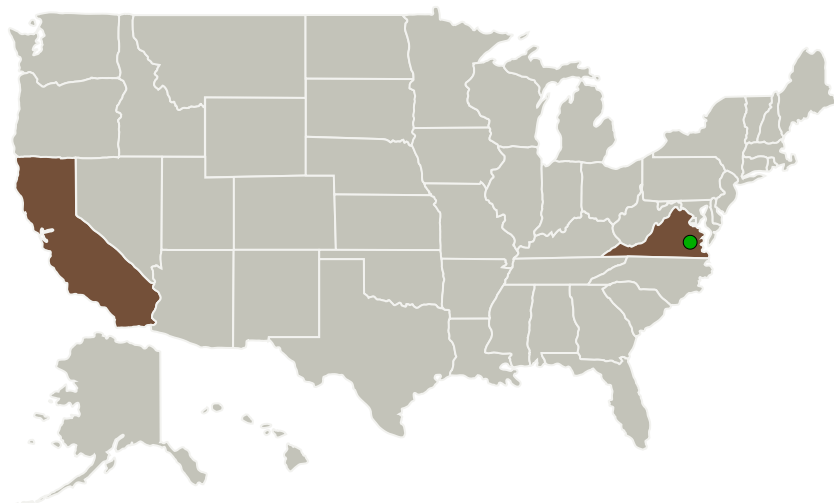
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Angstrom Designs, Inc.	Lead Organization	Industry	Santa Barbara, California
● Langley Research Center (LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

California	Virginia
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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Angstrom Designs, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

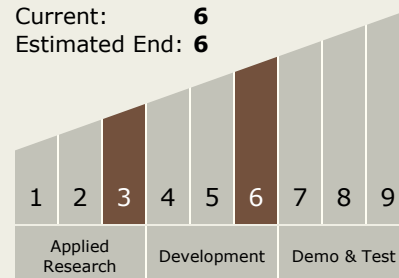
Carlos Torrez

Principal Investigator:

Peter Sorensen

Technology Maturity (TRL)

Start: 3
 Current: 6
 Estimated End: 6

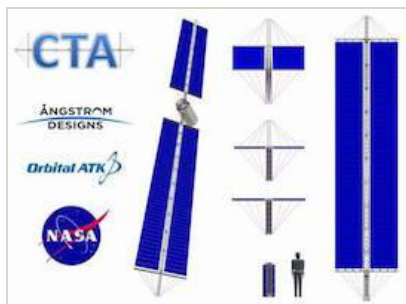


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Images



Briefing Chart Image

Compact Telescoping Array Design and Development, Phase II
(<https://techport.nasa.gov/image/127424>)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System